

Workshop III: Geometry of Big Data

Monday April 29, 2019

- 8:00–8:55 *Check-in/Breakfast (hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00–9:40 **Pradeep Ravikumar** (Carnegie Mellon University)
DAGs with NO TEARS: Continuous Optimization for Structure Learning
- 9:50–10:05 *Break*
- 10:05–10:45 **Ronen Talmon** (Technion - Israel Institute of Technology)
Data Analysis with the Riemannian Geometry of Symmetric Positive-Definite Matrices
- 10:55–11:10 *Break*
- 11:10–11:50 **Yusu Wang** (Ohio State University)
Metric learning for persistence-based summaries and application to graph classification
- 12:00–1:30 *Lunch (on your own)*
- 1:30–2:10 **Dejan Slepcev** (Carnegie Mellon University)
Proper regularizers for semi-supervised learning
- 2:20–2:35 *Break*
- 2:35–3:15 **Jianfeng Lu** (Duke University)
Solving for committor functions in high dimension
- 3:25–3:40 *Break*
- 3:40–4:20 **Lorenzo Rosasco** (Università di Genova)
A consistent framework for structure machine learning
- 4:30–6:00 *Poster Session & Reception (Hosted by IPAM)*

Tuesday April 30, 2019

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–9:40 **Frederic Chazal** (Institut National de Recherche en Informatique et Automatique (INRIA))
On the density of expected persistence diagrams and its kernel based estimation
- 9:50–10:05 *Break*

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- 10:05–10:45 **Richard Samworth** (University of Cambridge)
Log-concave density estimation: adaptation and high dimensions
- 10:55–11:10 *Break*
- 11:10–11:50 **Nathan Srebro** (TTI-Chicago)
Infinite-Width Bounded-Norm Networks: A View from Function Space
- 12:00–1:45 *Lunch (on your own)*
- 1:45–2:25 **Andrea Montanari** (Stanford University)
Some geometric surprises in modern machine learning
- 2:35–2:50 *Break*
- 2:50–3:30 **Amit Singer** (Princeton University)
Multi-target detection and cryo-EM imaging by autocorrelation analysis
- 3:40–3:55 *Break*
- 3:55–4:35 **Rebecca Willett** (University of Chicago)
Learning to Solve Inverse Problems in Imaging

Wednesday May 1, 2019

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–9:40 **Bin Dong** (Peking University)
Bridging Deep Neural Networks and Differential Equations for Image Restoration and Beyond
- 9:50–10:05 *Break*
- 10:05–10:45 **Marina Meila** (University of Washington)
Manifold Learning for the Sciences
- 10:55–11:10 *Break*
- 11:10–11:50 **Mahdi Soltanolkotabi** (University of Southern California (USC))
Towards demystifying over-parameterization in deep learning
- 12:00–1:45 *Lunch (on your own)*
- 1:45–2:30 **Stanley Osher** (University of California, Los Angeles (UCLA))
PDE Approaches for Deep Learning
- 2:40–2:55 *Break*
- 2:55–3:35 **Imre Risi Kondor** (University of Chicago)
Covariant neural networks for learning physical systems
- 3:45–4:00 *Break*

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4:00–4:40 **Naftali Tishby** (Hebrew University)
Topological transitions (and symmetries) of input representations in Deep Learning

Thursday May 2, 2019

8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*

9:00–9:40 **Richard Tsai** (University of Texas at Austin)
Machine learning approaches for a few optimization problems involving lines-of-sight

9:50–10:05 *Break*

10:05–10:45 **Bin Yu** (University of California, Berkeley (UC Berkeley))
PCS workflow, interpretable machine learning, and DeepTune

10:55–11:10 *Break*

11:10–11:50 **Hongkai Zhao** (University of California, Irvine (UCI))
Intrinsic complexity: from approximation of random vectors and random fields to solutions of PDEs

12:00–1:45 *Lunch (on your own)*

1:45–2:25 **Zuowei Shen** (National University of Singapore)
Deep Approximation via Deep Learning

2:35–2:50 *Break*

2:50–3:30 **Joel Tropp** (California Institute of Technology)
SketchySVD

3:40–3:55 *Break*

3:55–4:35 **Jianfeng Cai** (Hong Kong University of Science and Technology)
Solving Systems of Phaseless Equations: Riemannian Optimization and Global Geometry

Friday May 3, 2019

8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*

9:00–9:40 **Anastasia Dubrovina** (Lyft)
Structured embedding spaces for shape completion and synthesis

9:50–10:05 *Break*

10:05–10:45 **Chao Gao** (University of Chicago)
Robust Estimation and Generative Adversarial Nets

10:55–11:10 *Break*

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11:10–11:50 **Mauro Maggioni** (Duke University)
Learning Interaction kernels in agent-based systems

12:00 *Conclusion*

